

USDA
NATURAL RESOURCES
CONSERVATION SERVICE
MARYLAND CONSERVATION
PRACTICE STANDARD

**FOREST STAND
IMPROVEMENT**

CODE 666
(Reported by Ac.)

**CONDITIONS WHERE PRACTICE
APPLIES**

This practice may be applied to all forest land where improvement of forest resources by cutting or killing of selected trees and/or understory vegetation is needed.

This practice does not apply to management activities for which other standards are more applicable. (Refer to the Maryland conservation practice standards for Brush Management, Code 314; Pest Management, Code 595; and Upland Wildlife Habitat Management, Code 645.)

DEFINITION

The manipulation of species composition, stand structure, and stocking by cutting or killing selected trees and understory vegetation.

PURPOSES

This practice may be applied for one or more of the following purposes:

1. To increase the quantity and quality of forest products by manipulating stand density and structure;
2. To improve growing conditions in a stand by selectively harvesting or thinning trees;
3. To facilitate forest stand regeneration;
4. To reduce the potential of damage from pests, and moisture stress;
5. To restore natural plant communities;
6. To reduce wildfire hazard;
7. To increase carbon storage in selected trees;
8. To improve water conservation and yield;
9. To improve aesthetic, recreation, and open space values;
10. To improve wildlife habitat.

CONSIDERATIONS

Consider that prior management activities on a site may limit silvicultural objectives and harvest-regeneration strategies. These objectives and strategies may also change over time.

Before forest stand improvement activities begin, consider any potential liability issues involving landowners and operators.

Successful regeneration of desirable species is usually dependent upon timely application of forest stand improvement and other conservation practices such as site preparation, tree and shrub establishment, and use exclusion.

The extent, timing, size of the treatment area, and the intensity of the practice should be adjusted to minimize adverse cumulative effects (onsite and offsite), such as hydrologic and stream alteration, habitat fragmentation, nutrient cycling, biodiversity and visual resources.

Consider wildlife food and cover needs when scheduling and implementing this practice. To the extent feasible, the practice should be timed to minimize disturbance of seasonal wildlife activities (e.g., nesting and raising young).

Consider other environmental concerns such and threatened and endangered species, water quality, and natural areas.

Slash, debris and other vegetation (biomass) removed during stand improvement may be used to produce energy. Management alternatives should

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the [Natural Resources Conservation Service - Maryland](#) or visit the [electronic Field Office Technical Guide \(eFOTG\)](#).

consider the amount of energy required to produce and convert the biomass into energy with the amount produced by the biomass.

Identify and evaluate any constraints such as management options; economic feasibility; local, state and federal regulations; or cost-share program requirements.

Clients should be advised of responsibilities of wildfire control and consider the development of a wildfire control plan including “defensible” space, access routes, fires –season water source and location of wildfire control facilities.

CRITERIA

General Criteria Applicable to All Purposes

Forest stand improvement activities should be done based on recommendations included in a Forest Management Plan. Refer to the Maryland conservation practice standard for Prescribed Forestry (Code 409) for more information.

The harvest-regeneration strategy will be identified for all planned forest improvement harvesting, including:

1. Uneven-aged management (e.g., single tree selection, group selection, coppice selection);
2. Even-aged management (e.g.; clear-cut, seed-tree, shelter wood, coppice).

The extent or size and orientation of treatment area(s) shall be identified as part of the practice design.

Preferred tree and understory species shall be identified and retained to achieve all planned purposes.

Spacing, density, and numbers of desired trees and understory species to be retained shall follow established professional forestry guidelines for the intended purpose. Such guidelines shall contain stocking in terms of basal area, spacing, or trees per acre by species and size class distribution.

The method, felling direction, and timing of tree cutting for harvest shall facilitate efficient and safe tree removal while protecting important resources (e.g. residual trees, wetlands, cultural re-

sources). Harvest within riparian zones will be directed away from the water so that equipment traffic and hydrologic alterations are eliminated or minimized.

Forest stand improvement activities shall be performed to minimize soil erosion, compaction, rutting, and damage to remaining vegetation.

Slash and debris left on the site after treatment shall not present an unacceptable fire, safety, environmental, or pest hazard. Such remaining material shall not interfere with the intended purpose of the practice or other management activities.

Unwanted trees, shrubs, and vines may be killed by any of the following means: cutting, girdling, frilling, stem injection, basal bark spray.

Follow the recommendations of a registered professional forester for all thinning and other forest stand improvement activities.

Use of Herbicides - When choosing herbicides to kill unwanted trees, shrubs, and vines, review leaching runoff potentials, setback requirements, and toxicity information.

Follow the directions and heed all of the precautions on the herbicide container label. Observe all applicable federal and state laws pertaining to the use of herbicides. If herbicides are handled or applied improperly, or if unused portions are not disposed of safely, they may injure humans, domestic animals, desirable plants, wildlife, and fish, and may contaminate nearby crops and other vegetation. Herbicides shall not be used over or directly adjacent to ponds, lakes, streams, wetlands, or other waterbodies unless so labeled.

For specific herbicide recommendations, contact the appropriate specialist from Maryland Cooperative Extension; the Maryland Department of Agriculture, Weed Control Program; or the Maryland Department of Natural Resources, Forest Service.

Permits and Approvals - Comply with applicable federal, state and local laws and regulations during the implementation of this practice. Obtain all required permits and authorizations before beginning any work.

Maryland State Law requires that a sediment and erosion control plan be developed for any forest harvest activity involving 5,000 square feet or more of disturbed area, or if the harvest area includes a perennial or intermittent stream. Contact the local Soil Conservation District office to obtain approval of a sediment control plan on private land.

Timber harvests within 1,000 feet of the Chesapeake Bay or its tidal tributaries require that an approved Forest Management Plan be prepared by a registered professional forester.

Any harvest activities that change the course, current or cross section of streams or affect wetlands may require permits or authorizations from the Maryland Department of the Environment. For forestry activities in non-tidal wetlands, a registered professional forester must prepare a sediment and erosion control plan that includes best management practices to protect wetlands. The sediment and erosion control plan must be submitted to and approved by the local Soil Conservation District.

Contact the Maryland Department of Natural Resources for details concerning forestry regulations, including Maryland's Best Management Practices.

Additional Criteria to Reduce Wildfire Hazard

Reduce stocking rates of trees to minimize crown-to-crown spread of fire.

Remove "ladder" fuels to minimize the occurrence of crown fires.

Further treat or eliminate slash accumulations next to roads and trails.

Reduce or eliminate species with high volatility, but not to a level that would compromise either intended purposes.

Additional Criteria to Improve Wildlife Habitat

Manage for tree species and stocking rates that meet food and cover requirements for desired wildlife species.

Create and maintain sufficient snags and downed woody material to meet requirements of desired species in balance with conditions needed to achieve other intended purposes.

Minimize improvement actions that disturb seasonal wildlife activities (e.g., nesting and raising young).

Refer to the Maryland conservation practice standards for Upland Wildlife Habitat Management, (Code 645) and Wetland Wildlife Habitat Management (Code 644) to further develop and manage wildlife-related activities.

Additional Criteria to Increase Carbon Storage in Selected Trees

Manage for tree species and stocking rates that have higher rates of growth and potential for carbon sequestration.

Note: Specific cost-sharing programs or other funding sources may impose criteria in addition to, or more restrictive than, those specified in this standard.

PLANS AND SPECIFICATIONS

Plans and specifications for Forest Stand Improvement shall be prepared for each site or management unit according to the Considerations, Criteria, and Operation and Maintenance described in this standard. They shall be recorded on specification sheets, job sheets, narrative statements in conservation plans, or other acceptable documentation. Documentation shall be in accordance with the section "Supporting Data and Documentation" in this standard.

Plans and specifications shall include the following, as applicable: identification of desired species and species to be removed; intended stocking rates in terms of basal area, spacing, or trees per acre by species and size class distribution; recommended methods for thinning, selective harvest, etc.

OPERATION AND MAINTENANCE

The forest management plan shall include recommendations for periodic inspections during and after treatment activities to ensure that objectives are achieved and resource damage is minimized. Follow-up and ongoing management activities will be needed to obtain desired results.

Operation and Maintenance (O&M) activities may include the following:

1. Periodically checking the stand for insects and diseases, and if an incidence threatens stand survival, taking corrective action to keep the pest under control;
2. Controlling undesirable plants as needed to achieve management goals;
3. Protecting trees from fire and damage from livestock.

SUPPORTING DATA AND DOCUMENTATION

The following is a list of the minimum data and documentation to be recorded in the case file:

1. Field location and extent of the management unit in acres. Also note the location of the management unit on the conservation plan map;
2. Assistance notes documenting the purpose of the practice, dates of site visits, discussions with the client, decisions made, and by whom;
3. Documentation of the management practice applied including the type of practice, amount, date completed, and location.
4. Completed copy of the appropriate forest management plan, Job Sheet(s), or other management specifications, as appropriate.

REFERENCES

1. Kays, Jonathon. *Developing a Forest Management Plan: The Key to Forest Stewardship*. Fact Sheet 625. Maryland Cooperative Extension, University of Maryland, College Park.
2. Maryland Department of the Environment. *Construction on Nontidal Waters and Floodplains*. Code of Maryland Regulations (COMAR) 26.17.04.
3. Maryland Department of the Environment. *Nontidal Wetlands*. Code of Maryland Regulations (COMAR) 26.23.01 - 26.23.06.
4. Maryland Department of Natural Resources. *Forest Stewardship*. Available on the internet at: <http://www.dnr.state.md.us/forests>
5. Maryland Department of Natural Resources. 2001. *A Guide to Maryland Regulation of Forestry Related Practices*.
6. North Carolina Cooperative Extension. *Woodscaping Your Woodlands*. Available on the internet at: <http://www.ces.ncsu.edu/nreos/forest/steward/pdf/ag584.pdf>